

**Cruise Plan for Walrus Tagging Aboard the P/V Stimson  
Bering Sea, March 2005**

***March 8, 2005***

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Anadyr, Chukotka 689000 Russia

## **BACKGROUND**

The U.S. Fish and Wildlife Service and U.S. Geological Survey are working together to develop a method to estimate the abundance of Pacific walruses over their entire range. The proposed method includes two components, an aerial survey using thermal imagery to count animals on ice (USFWS lead), and deployment of satellite radio transmitters to estimate the number of animals that are in water and unavailable for counting during the survey over-flights (USGS lead). This cruise plan pertains to the latter, our efforts to estimate walrus availability bias with satellite telemetry.

Walrus capture is time consuming and difficult. Therefore we are developing a remotely deployed satellite tag that will report on the haulout status of a given animal continuously over a 4-5 week period. Data from future deployments will be used to estimate the proportion of time walruses are hauled out during a 2-week aerial survey. The mean retention time of 3 tag designs that were deployed in spring of 2004 was greater than 4 weeks, however, retention time varied considerably within and among tag designs and some data series were discontinuous.

The purpose of this cruise is to compare the performance of 3 tag designs, which are modifications from those used in 2004, and to obtain additional haul-out data that will be used to assess sample size requirements for a comprehensive survey. These data will be collected a few weeks earlier than the data collected in 2004 and closer to the time of year that is anticipated for a comprehensive survey. A secondary objective will be to obtain skin biopsies from live animals for ongoing genetics studies.

## **CRUISE OBJECTIVES**

- (1) Deploy 30 tags on male and female walruses in southeastern Bering Sea to test modified tags and estimate proportion of time hauled out.
- (2) Obtain tissue biopsies from tagged animals and other designated animals for ongoing genetics studies.

## **DATA COLLECTION**

### **Cruise**

The route of the cruise will be determined from ice conditions, distribution of walruses, and capabilities of the ship. Two areas will be considered for work if ice conditions permit: north central and southeastern Bering Sea. The two regions will be tentatively defined by a single longitudinal line based on ice conditions. Information on ice conditions and aerial reconnaissance from these areas will be used to determine the initial target area just before departure from Dutch Harbor. The north central area will only be considered as an initial target if very large open areas in the sea ice exist; otherwise, it will be considered a potential second target after at least half of the tagging is completed in the southeastern area and ice conditions permit direct travel to the area. Aerial reconnaissance will be used throughout the cruise to direct the ship to walrus aggregations within areas of unconsolidated ice.

Two tagging crews comprising 3 and 4 personnel will work independently to deploy tags and obtain biopsy samples. The ship will maintain an appropriate distance to avoid disturbance of

the animals. Communication and location equipment will be activated so the ship has constant visual or radar assessment of the location of each skiff.

### **Tagging**

The following tag deployments are anticipated:

- 10 – post tags from crossbow
- 14 – implant tags from air gun (some may be deployed from crossbow)
- 6 – tether tags from air gun

Tagging crews will approach within 15 m of individual walrus herds by skiff. Telemetry tags will be affixed to walruses with a crossbow or air gun. A total of 30 tags consisting of 3 designs will be deployed on an equal number of males and females. Tags will be deployed roughly proportional to the size of the aggregation and among a few different groups in as random a fashion as possible within each aggregation.

### **Biopsy**

Biopsies will be collected with crossbows and floating arrows with cutting heads from live animals. In some cases, retrieval lines will be attached to facilitate retrieval of the arrows. Each arrow will be numbered with an indelible marker and the arrow number will be recorded prior to shooting, along with pertinent information on the target animal (i.e. gender, approx. age, etc.). After an arrow is retrieved, the cutting head will be unscrewed from the arrow and placed into a whirl-pack with appropriate labeling. Tissue samples will be extracted from each cutting head after return to the ship and stored in vials pre-filled with tissue preservative.

Sample needs are based on two ongoing genetic studies, one in which breeding adult males and females are compared among breeding aggregations, and a second investigating potential relatedness of individuals on ice floes. In the first case, all sample needs were collected in the southeastern Bering Sea region last year, so we will target adult males and females across groups only within the northern Bering Sea, if tagging in this area eventuates. We will target a minimum of 30 samples within each sex (total = 60). In the second instance, we want to sample what we think might be first and second generation family groups or other potential groups of interest based on behavior and proximity to one another on an ice floe. We will attempt to photograph these groups prior to sampling. Biopsy collections will follow immediately after each tagging effort or from independent efforts as time permits. Priority will be given to the tagging efforts.

## **CRUISE TASKS**

### **SKIFFS**

Skiff 1 (NMFS Avon): 3 personnel

Skiff 2 (Stimson Safeboat): 4 personnel

#### **Skiff 1 (Avon)**

Tony (boat operator, biopsy shooter #3)

Mikkel (tagger, biopsy shooter #2)

Mary (biopsy shooter #1, biopsy data recorder, photographer)

#### **Skiff 2 (Safeboat)**

EWC personnel (boat operator, biopsy shooter #3)

Chad (tagger, biopsy shooter #2)

Anatoly (biopsy shooter #1)

Lori (biopsy data recorder, photographer)

Duties will be exchanged at times between:

Tony – Chad between skiffs

Tony – Mikkel on skiff 1

Chad – Mikkel on skiff 1

Anatoly – Lori on skiff 2 (except data recording)

#### **Boat Operator**

- Operate boat and direct tagging operation

- Score & Record walrus group composition

- Record tag deployment

- Maintain scheduled communications with ship

#### **Tagger**

- Prepare and deploy radio tags

- Assist biopsy shooter and biopsy data recorder

#### **Biopsy shooter**

- Prepare and deploy biopsy darts as needed in order - shooters #1, #2, #3

#### **Biopsy data recorder**

- Record and store biopsy collection

#### **Photographer**

- Photograph tagging and other when possible as needed

### **SHIPBOARD**

#### **Cruise Leader (Chad)**

- Evaluate weather, ice conditions and previous day's aerial reconnaissance

- Direct tagging mission, deployments, and ship's course

#### **Data Manager (Fischbach assisted by other computer inclined person)**

- Download and process aerial reconnaissance data.

- Download and process ARGOS data.

- Ensure data from tagging and biopsy missions are entered, error checked, and backed up daily.

#### **Photography Manager (Mary lead and assisted by other photographer of the day)**

- Ensure that cameras are downloaded daily

- Organize photos

Backup files  
Coordinate photo needs with Chad and Tony

### **Sample management**

Curate biopsy samples daily (**Primary biopsy shooters and biopsy data recorder**)

### **Equipment preparation**

Ensure that Telonics tags & crossbow gear are ready for each mission (**Chad or Tony**)  
Ensure that Wildlife Computer tags & air gun equipment are ready for each mission (**Mikkel**)  
Ensure that safety gear is checked and loaded, and skiffs are prepared (**Boat operator of the day**)  
Prepare cameras (**Photographers of the day**)

### **All tagging crew members**

Bring personal safety gear, drinks, and food on each tagging mission

### **Photography**

Crew members who are asked to take photographs for the project are to understand that their photographic efforts fill a role that is directed and required for the project. Photos taken with agency cameras will be the property of, and credits will be assigned to, the agencies conducting the research cruise – U.S. Fish & Wildlife Service and U.S. Geological Survey.

### **Desired photographs:**

- Taggers shooting tags – take photo from opposite skiff or ship if possible
- Every tag immediately after deployment if possible
- Tagged walrus in water
- Biopsy shooters
- Biopsy retrieval – from tethered dart or dip net
- Walrus “group” members prior to group biopsy efforts
- Skiffs working in sea ice – take photo from opposite skiff or ship

## **Training and familiarity**

### **Skiff**

Communications

- GPS 76
- eTrex
- skiff radio
- marine hand-held radio
- aviation hand-held radio
- satellite phone

Boat operation

Survival gear

Biopsy

- crossbows
- data sheets

Cameras

### **Ship**

Muster

Survival suits

**Contact Information:**

<b>Contact</b>	<b>Numbers</b>
Stimson Satellite Phone	DETAILS REMOVED FOR PUBLIC DOCUMENT
US Fish and Wildlife Service MMM Satellite Phone on Stimson	DETAILS REMOVED FOR PUBLIC DOCUMENT
Stimson dockside in Dutch Harbor	(907) 581-6313
Stimson's Dutch Harbor Office	(907) 581-1432
Stimson's Dutch Harbor Office FAX	(907) 581-1407
Stimson's Anchorage Coordinator Ann Porter	(907) 269-0389
Stimson's Inmarsat-C e-mail account DETAILS REMOVED FOR PUBLIC DOCUMENT send text only e-mails. E-mails will be billed at \$1 per 128 characters including spaces to Fischbach's credit card.	DETAILS REMOVED FOR PUBLIC DOCUMENT
Stimson's satellite FAX NOTE: Send no cover page. Limit transmissions to 2 pages.	403-543-8516
Aerial Reconnaissance e-mail account on the <a href="http://mail.yahoo.com">http://mail.yahoo.com</a> DETAILS REMOVED FOR PUBLIC DOCUMENT	DETAILS REMOVED FOR PUBLIC DOCUMENT
Aviation Radio on board Stimson (range 118.00 – 135.97)	Stimson usually uses 129.00 Chat frequency recommended by Commander NW Ltd 123.45
Marine VHF Radio	Hail on channel 16 (156.800 MHz) Chat on channel 78A (156.925 MHz) Or channel 71 (156.575 MHz)
Alaska Science Center:      Front Desk Chad Jay Tony Fischbach	(907) 786-3512 (907) 786-7414 (907) 786-7145
USFWS Marine Mammals Mgt:      Front Desk Toll Free	(907) 786-3800 1-800-362-5148
Commander96 on board sat phone USFWS Sat Phone on Commander96	DETAILS REMOVED FOR PUBLIC DOCUMENT DETAILS REMOVED FOR PUBLIC DOCUMENT

**Outside communication with ship:**

Daily ship-to-shore safety checks will be made by Stimson as part of their regular communication with the Anchorage coordination office via e-mail, satellite two-way radio phone, and satellite phone. During the cruise, messages from family or others may be relayed to the ship via dispatch phone with Ann Porter (269-0389, Anchorage) or Dianne (581-1432, Dutch Harbor). While in port, calls can be made via dockside numbers.

Emergency contact to ship

Direct dial to Stimson satellite phone: *DETAILS REMOVED FOR PUBLIC DOCUMENT* (international call)

Can try direct dial to USFWS satellite phone on Stimson: *DETAILS REMOVED FOR PUBLIC DOCUMENT* (intl. call)

Phone Ann Porter (269-0389, Anchorage) or Dianne (581-1432, Dutch Harbor) to pass message.

**Communication protocol from skiffs:**

- 1) Boat operator radio Stimson every 1-2 hours and give GPS location. Log call.
- 2) In case of emergency, contact Stimson with skiff radio or marine hand-held, aviation hand-held, or satellite phone. If unable to hail Stimson and life threatening, use satellite phone to contact Coast Guard or initiate Personal Location Beacon (PLB).

**Aerial Reconnaissance Crew to Ship:**

- 1) Daily flight observations will be communicated via text e-mailing of flight log data as described in “Instructions to the Aerial Reconnaissance Crew for Track logging with Garmin GPS units”.
- 2) Satellite telephone calls from the reconnaissance crew to the USFWS MMM satellite phone on the ship will facilitate limited chat discussions. The Stimson’s satellite telephone will be used as a back up for this.
- 3) Marine VHF radios will be used to facilitate in-flight chat discussions between the plane and field crews when the plane is within range of the field crew. Hail on channel 16 (156.800 MHz) and chat on channel 78A (156.925 MHz) or channel 71 (156.575 MHz).
- 4) If hailing on marine VHF fails, then hail on aviation VHF frequency 129.00 or 123.45 for in-flight chat discussions.

**Ship Access to Ice Charts**

When the Stimson is unable to access sea ice charts via the weather FAX system, the tagging crew will access sea ice charts, available at the url <http://pafc.arh.noaa.gov/data/ice/ice.gif>, by using Stratos internet service accessed over an Iridium phone modem connected to a laptop.

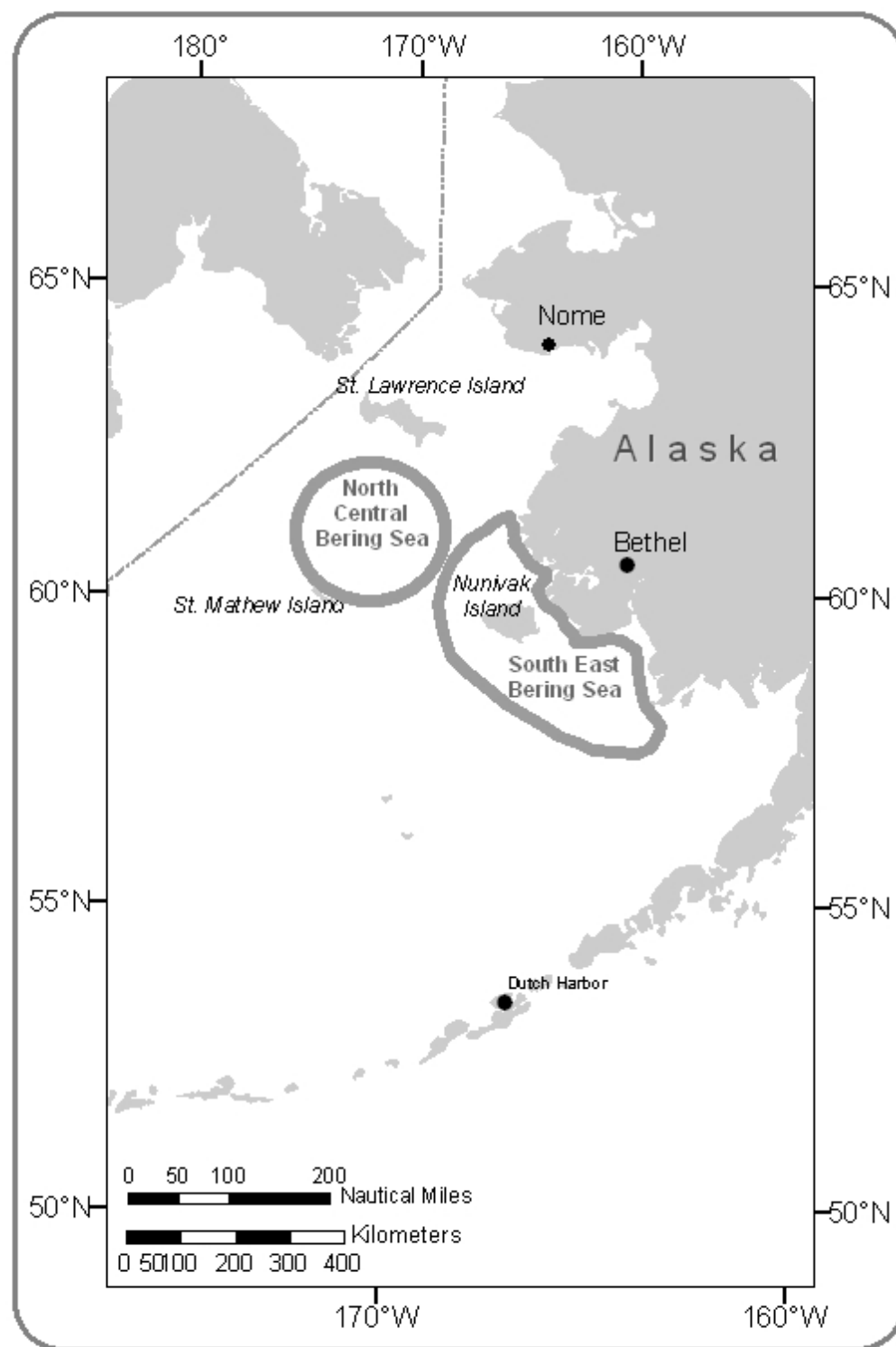


Field crew for April 2005 cruise aboard P/V Stimson.

<i><b>Field Crew</b></i>	<i><b>Contact Address</b></i>	<i><b>Emergency Contact</b></i>
Michael Apatiki	Eskimo Walrus Commission Gambell, Alaska	
Mary Cody	U.S. Fish and Wildlife Service Marine Mammals Management 1011 East Tudor Road Anchorage Alaska 99503  ph: 786-3913 fax: 786-3816	
Tony Fischbach	U.S. Geological Survey Alaska Science Center 1011 East Tudor Road Anchorage, Alaska 99503  ph: (907) 786-7145 fax: (907) 786-7150 afischbach@usgs.gov	
Chad Jay (Project Leader)	U.S. Geological Survey Alaska Science Center 1011 East Tudor Road Anchorage, Alaska 99503  ph: (907) 786-7414 fax: (907) 786-7150 chad_jay@usgs.gov	
Mikkel Jensen	Gislingevej 2 Dk-4571 Grevinge Denmark  ph: +45 5966 0083 fax: Same mikkelsvaerksted@dragsholm.com	

<i><b>Field Crew</b></i>	<i><b>Contact Address</b></i>	<i><b>Emergency Contact</b></i>
Anatoly A. Kochnev	Pac. Sci. Res. Fish. Center (TINRO) Chukotka Branch Laboratory of Marine Mammals Study P.O. Box 29 Anadyr, Chukotka 689000 Russia  E-mail: kochnev@anadyr.ru Phone: (42722) 266-47 Fax: (42722) 267-61 Home phone: (42722) 243-64	
Lori Quakenbush	Alaska Department of Fish and Game Division of Wildlife Conservation 1300 College Road Fairbanks, AK 99701-1599  ph: (907) 459-7214 fax: (907) 452-6410 lori_quakenbush@fishgame.state.ak.us	

Figure 1. Proposed areas for spring 2005 walrus tagging. The northern area will only be considered if ice conditions are light.



## DATA STRUCTURE

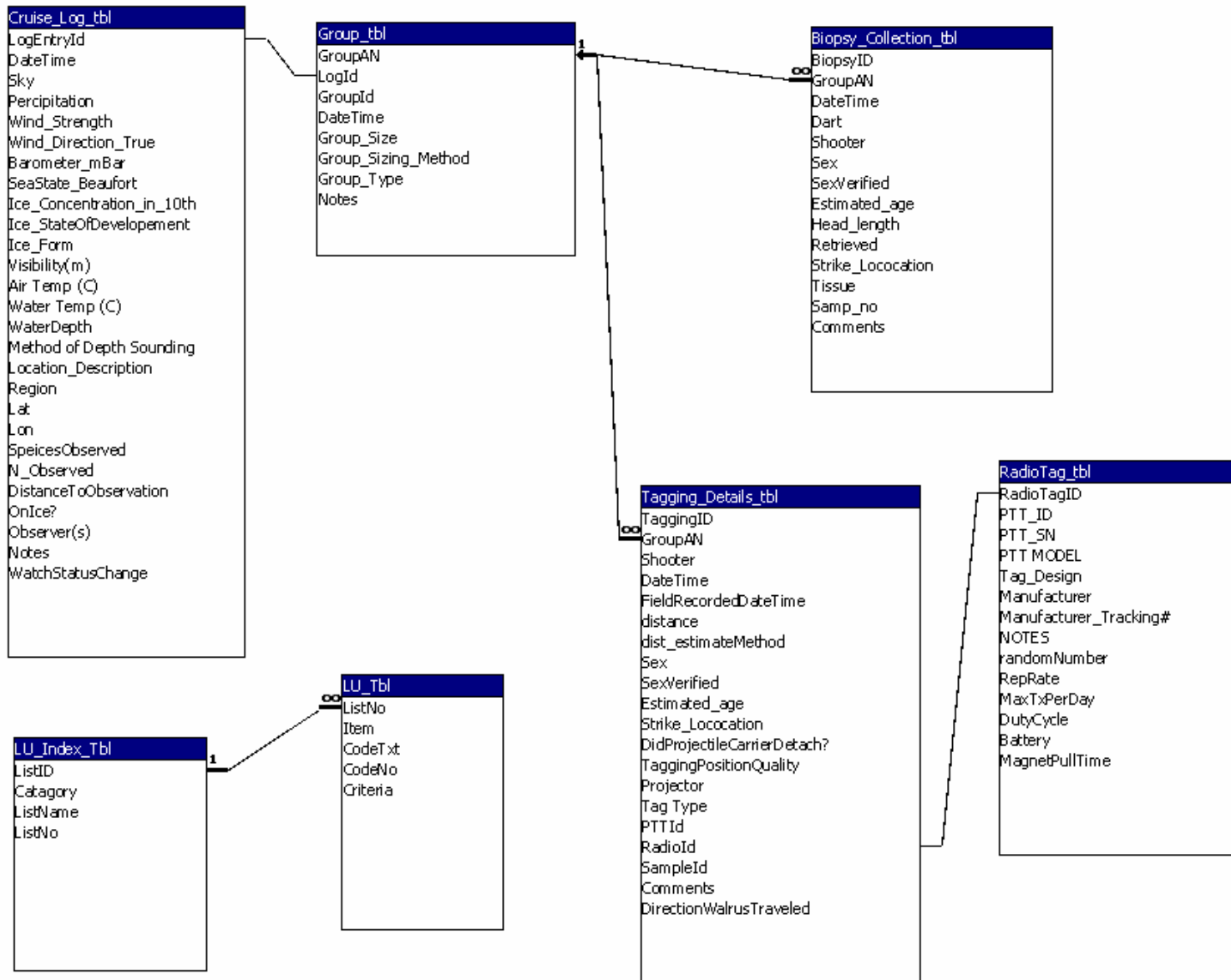


Table: Cruise\_Log\_tbl

Purpose: Store information on location, weather, sea ice & other marine mammal observations

Name	Type	Size	
LogEntryId	Long Integer	4	Auto number field; Primary Key
DateTime	Date/Time	8	
Sky	Text	50	Clear, partly cloudy, partly clear, overcast
Percipitation	Text	50	None; mist; rain; sleet; snow
Wind_Strength	Byte	1	Wind strength in knots
Wind_Direction_True	Long Integer	4	Wind direction in degrees true
Barometer_mBar	Long Integer	4	Barometric reading in millibar
SeaState_Beaufort	Byte	1	0 – 12: See Beaufort Sea State chart
Ice_Concentration_in_10th	Byte	1	Ice Concentrations in 10 <sup>th</sup>
Ice_StateOfDevelopment	Text	50	Ice Form from NOAA Ice Observers Guide
Ice_Form	Text	50	Ice Form from NOAA Ice Observers Guide
Visibility(m)	Integer	2	Visibility in meters
Air Temp (C)	Single	4	Air temperature in Celcius
Water Temp (C)	Single	4	Sea water temperature in Celcius
Location_Description	Memo	-	General description of location
Region	Text	50	
Lat	Single	4	WGS84 from ship's track log
Lon	Single	4	WGS84 from ship's track log
SpeicesObserved	Text	255	
N_Observed	Integer	2	
DistanceToObservation	Integer	2	
OnIce?	Yes/No	1	
Observer(s)	Text	255	
Notes	Memo	-	
WatchStatusChange	Text	255	

Table: Group\_tbl

Purpose: Accommodate information about walrus groups observed during biopsy and tagging efforts.

Name	Type	Size	
GroupAN	Long Integer	4	Auto number field; Primary Key
LogId	Long Integer	4	Foreign Key to Cruise_Log table
GroupId	Text	50	Unique Id for herd observation: XX-yyyy-mm-dd-nnn where XX = platform code (MS mother ship; S1 = skiff 1; S2...); yyyy = 4-digit year; mm = 2 digit month; dd = 2 digit day of month; nnn = 3 sequential observation number for platform XX.
DateTime	Date/Time	8	
Group_Size	Integer	2	Number of animals in group
Group_Sizing_Method	Text	50	Was the group sized based on a count or an estimate?
Group_Type	Text	50	Maternal, mixed, or all male
Notes	Memo	-	

Table: Biopsy\_Collection\_tbl

Purpose: Document each remote biopsy collection attempt

<b>Name</b>	<b>Type</b>	<b>Size</b>	<b>Descriptions</b>
BiopsyID	Long Integer	4	Auto number field, Primary Key
GroupAN	Long Integer	4	Links to Group_tbl.GroupAN
Dart	Byte	1	Number written on dart fletching
Shooter	Text	255	Who took the shot?
DateTime	Date/Time	8	
Sex	Text	255	Male, Female, Unknown
SexVerified	Yes/No	1	Was the ventral surface observed?
Estimated_age	Text	255	Use Fay diagram
Strike_Lococation	Text	255	Location of walrus body struck.
Head_length	Double	8	25mm, 40mm
Retrieved	Yes/No	1	Was dart retrieved?

Tissue	Text	255	Tissue collected: usually skin
Samp_no	Text	255	Sample Id: links to Master_Genetics_Sample_tbl.SampleId
Comments	Memo	-	

Table: Tagging\_Details\_tbl

Purpose: Document radio deployment efforts

Name	Type	Size	Description
TaggingID	Long Integer	4	Auto number field, Primary Key
GroupAN	Long Integer	4	Links to Group_tbl.GroupAN
Shooter	Text	255	Who was the tagger?
DateTime	Date/Time	8	Date and time of deployment local (GMT-9) based on either field data or ARGOS analysis when not recorded in the field
FieldRecordedDateTime	Date/Time	8	Date and time of deployment local (GMT-9)
distance	Double	8	Distance in meters to between walrus and tagger
dist_estimateMethod	Text	255	Estimated or distance finder
Sex	Text	255	Male, Female, Unknown
SexVerified	Yes/No	1	Was the ventral surface observed?
Estimated_age	Text	255	Use Fay diagram
Strike_Location	Text	255	Location of walrus body struck.
DidProjectileCarrierDetach?	Yes/No	1	
TaggingPositionQuality	Byte	1	Subjective assessment of tag position 1 = good; 0 = poor
Projector	Text	255	Air gun; cross bow
Tag_Type	Text	50	Post; Implant; Tether
PTTId	Long Integer	4	ARGOS id
RadioId	Text	50	RadioId links to Radio_tbl.RadioId
SampleId	Text	255	Sample Id: links to Master_Genetics_Sample_tbl.SampleId
Comments	Text	255	
DirectionWalrusTraveled	Text	50	Assigned based on ARGOS relocations

Table: Radio\_tbl

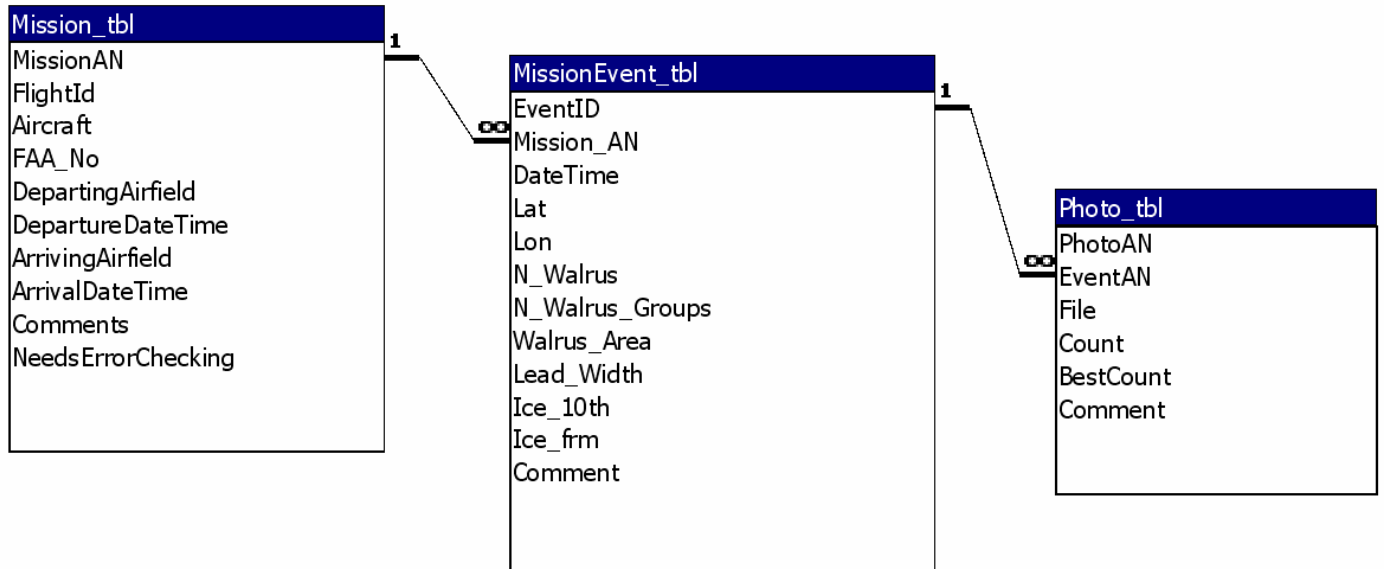
Purpose: Document radio tag properties

Name	Type	Size	Description
RadioTagID	Text	50	YYYY-Tnnn: where YYYY = year; T = tag design code (I = implant; P = Post; T = Tether); nnn = sequential number for tag of design T for year YYYY
PTT_ID	Long Integer	4	ARGOS id
PTT_SN	Text	50	Serial number of radio assigned by manufacturer
PTT_MODEL	Text	10	PTT radio model
Tag_Design	Text	50	Tag design: Implant; Post; Tether
Manufacturer	Text	255	
Manufacturer_Tracking#	Text	12	
NOTES	Memo	-	
randomNumber	Long Integer	4	Random number used to assign sequence of deployment
RepRate	Long Integer	4	Repetition rate of transmitter
MaxTxPerDay	Long Integer	4	Maximum number of transmissions allowed per day
DutyCycle	Text	50	Hours of operation (UTC)
Battery	Text	50	Type of battery and amp hour capacity of battery
MagnetPullTime	Date/Time	8	Date time that radio was activated

## AERIAL RECONNAISSANCE DATA.

### Relationships for AerialReconisaince

Monday, March 08, 2004



## FLIGHT DATA SHEET 2005 Walrus Study Aerial Recon

**FLIGHT:** \_\_\_\_\_  
yyyy-mm-dd[A/B]

Air Craft: *Aero Commander 690*      *N57096*    Pilot: **Ralph Aiken**

Departing: \_\_\_\_\_ Time: \_\_\_\_\_

Crew: *Marc Webber*  
**Brad Benter**

Arriving: \_\_\_\_\_ Time: \_\_\_\_\_

### Flight Summary:

[illegible]



[illegible]

## **Instructions to the Aerial Reconnaissance Crew for Track logging with Garmin GPS units**

UPDATED 17 FEB 2005

### **IN THE AIRCRAFT**

#### ***DATA SHEET***

Every observation must have a sighting time recorded to the nearest second.

If you punch a waypoint, note the waypoint number.

Tally the number of walrus groups that fall into each size class:

Small: 1-10

Medium: 11-25

Large: 26-100

Very Large: more than 100

For very large groups record your estimate for the size of the groups: if there are more than 2 very large groups, start a new observation record.

If there is a substantial lead that you wish to record and transmit the location to the tagging ship, indicate the lead width in nautical miles.

You may record ice conditions in 10<sup>th</sup>.

Use the notes field to record major turns, major changes in visibility and other note worthy observations

#### ***GPS***

Ensure that the GPS is set up to tracklog throughout the course of the reconnaissance flight.

### **AT THE BASE**

#### **DOWNLOADING THE GARMIN TRACKLOG**

1. Connect the Garmin to the computer using the serial port cable that fits into the round socket on the back of the Garmin unit
2. Turn the Garmin on by pressing and holding the red button above the rocker pad
3. As the Garmin warms up an icon of a globe will rotate then a text screen will appear that identifies the software and base map versions that are run on the Garmin. Press the ENTER button to get the Garmin to continue (or wait 10 sec and it will continue on its own).
4. The Garmin will now start searching for satellites. Stop it from searching by putting it into 'simulator' mode by (a) bringing up the menu by pressing the MENU button then (b) selecting the menu option START SIMULATOR MODE with the rocker pad and pressing the ENTER button.

#### **MapSource Instructions**

1. On the laptop start the MapSource software. Look for the icon of the Globe
2. From the MapSource drop down menu, select FILE → Open From Device (or click on the icon that looks like a Garmin unit with an arrow pointing up)
3. You will get a dialog box that has a check box for all the wonderful items that may be downloaded from the Garmin. Select track log and waypoints, if you wish to download waypoints too.
4. After the track log has been downloaded, select and delete the tracks that do not pertain to the flight of interest.
5. Highlight the tracks that pertain the flight of interest.

6. Save the track log to a text file that may be read by the Access Database. Select FILE → Export. Select track and specify the ..\2005\_Tagging\AerialRecon\Tracklogs directory. Name it yyyyymmdd.txt e.g. 20000119.txt for January 19, 2000 track log. If there is more than one flight per day, add a letter after the date in the track log name (i.e. 20000119A.txt for the first flight of the day, 20000119B.txt for the second.)
7. Exit the Map Source software.

## LOAD AND LINK THE TRACKLOG

1. Begin a flight log entry.

NOTE: It is absolutely essential that you do these steps in this order.

- a. In Access open the flight data form
  - b. Press the “Add New Flight Mission” button to create a new record if you have not done so already.
  - c. Access will ask you for the date and create a flight id based on the date using the convention yyyy-mm-dd. If there is more than one flight in a day. Add an A or B to the flight id. The flight id that corresponds to the saved track log (i.e. Flight 2000-01-19A corresponds with track log 20000119A.txt).
3. On the Mission form click on the ‘Tracklog’ tab and click the ‘Ingest track’ button. Be sure that you have specified the correct GPS download software in the Defaults form.
  4. On the flight events tab of the ‘Mission’ form, enter the flight events with all the information on walrus, lead and ice observations. You may also enter the photo information at this time.
  5. Either double click the time field or go to the ‘tracklog’ tab and click the ‘link tracklog to events’ button. This will fill in the coordinates for each observation.

## CLEAR THE TRACKLOG FROM THE GARMIN MEMORY

1. If this has all worked, go back to your Garmin unit and clear out the track log so you will be ready for the next flight
  - a. On the Garmin press the MENU button twice to get to the main Garmin menu
  - b. Track Logging
  - c. At the Track Logging screen bring up a menu by pressing the MENU button
  - d. Select Clear active log
  - e. The memory use indicator should show that you have all your memory available. If it does, go ahead and shut off the Garmin by pressing the red power button.

## EXPORT OBSERVATIONS FOR E-MAIL

On the ‘Mission’ form’s ‘export’ tab, click the ‘Export for E-mail’ button. This will run the SightingsToExport\_qry query and export its results to a comma separated value ASCII file placed in the ..\2005\_Tagging\AerialRecon\Exported\_csv directory. The file will be named with the same convention used to name the flight file (i.e. yyyy-mm-dd[A/B].csv). Open this file with a text editor. Copy and paste it into your e-mail to send to the ship-based crew.